Section 7. Consumption Adjustments for Calculating Expenditures

Expenditures developed in the EIA State Energy Data System (SEDS) are calculated by multiplying the price estimates by the SEDS consumption estimates. The consumption estimates are adjusted to remove process fuel, intermediate petroleum products, electricity exports, and other consumption that has no direct fuel costs, i.e., hydroelectric, geothermal, wind, solar and photovoltaic energy sources, and some wood and waste.

Almost all aspects of energy production, processing, and distribution consume energy as an inherent part of those activities. SEDS industrial and transportation sector consumption estimates include energy consumed in the process of providing energy to the end-use consumer and are called "process fuel." Familiar examples include energy sources used in drilling for oil and gas and transporting natural gas and petroleum by pipeline. Another "process fuel" is the energy used in generating and delivering electricity to end users. Energy products that are subsequently incorporated into another energy product for end-use consumption are called "intermediate products." Motor gasoline blending components are familiar examples of intermediate products that are consumed as part of the finished motor gasoline sold at service stations and other outlets.

Process fuel and intermediate products are not purchased by the end user and, therefore, do not have prices. Although the end user does not consume either process fuel or intermediate products directly, he does pay for them, because the cost to the processor or distributor is passed on to the end user in the price of the final end-user product. If their use was left in the consumption estimates and was assigned prices, the expenditures would be counted twice, first as paid by the "processor" (producer, processor, or transporter) and again as included in the price to the end user.

Some renewable energy sources are not purchased. These include hydroelectric, geothermal, wind, photovoltaic, and solar thermal energy. The consumption of these sources, which are measured in SEDS as kilowatthours of electricity produced, are not included in the State energy expenditure estimates since there are no "fuel costs" involved. Wood and waste can be purchased or obtained at no cost. Wood consumption estimates in the residential sector, and wood and waste in the commercial and industrial sectors are adjusted in SEDS to remove estimated quantities that were obtained at no cost.

To estimate energy expenditures in the price and expenditure tables, the consumption of process fuel, intermediate products, and some of the renewable energy sources are subtracted from the end-use sector in which they are included in SEDS, either the residential, commercial, industrial, or transportation sector, and there are no prices associated with them.

Process fuel consumption adjustments include:

1. Fuel (petroleum, natural gas, steam coal) and electricity consumed at refineries
2. Crude oil lease, plant, and pipeline fuel
3. Natural gas lease and plant fuel
4. Natural gas pipeline fuel
5. Electrical system energy losses (i.e., energy consumed in the generation, transmission, and distribution of electricity).
6. Energy losses and co-products from the production of fuel ethanol.

Intermediate product consumption adjustments include:

1. Aviation gasoline blending components
2. Motor gasoline blending components
3. Natural gasoline (1970 through 1983)
4. Pentanes plus (1984 forward)

5. Plant condensate (1970 through 1983)
6. Unfinished oils
7. Unfractionated stream (1970 through 1983).

Starting in 1984, natural gasoline (including isopentane) and plant condensate are reported together as the new product, pentanes plus, and the components of unfractionated stream are reported separately under liquefied petroleum gases.

Renewable energy consumption adjustments include:

1. Photovoltaic and solar thermal energy in the residential (including commercial) sector and electric power sector;
2. Geothermal energy in the residential, commercial, industrial, and electric power sectors;
3. Electricity generated from hydropower in the commercial, industrial, and electric power sectors; and
4. Electricity generated from wind energy in the electric power sector; and
5. Estimated portions of wood consumed in the residential sector, and wood and waste in the commercial and industrial sectors that were obtained at no cost.

In addition, while consumption of supplemental gaseous fuels (SGF) are removed from SEDS total consumption estimates to prevent double-counting in both natural gas and the fossil fuels from which they are derived, prices and expenditures of SGF cannot be separately identified and are therefore not adjusted for double-counting in total energy average prices and total energy expenditure calculations.

Table TN56 shows the quantities of energy, by State, removed from SEDS consumption to calculate expenditures for 2007. Table TN57 shows the adjustments made to SEDS national consumption estimates for 1970 through 2007 to derive the net consumption data used to calculate expenditures.

State adjustment estimates from 1970 forward are available in the SEDS Internet data file, http://www.eia.gov/emeu/states/sep_fuel/html/csv/fuel_adjust_consum.csv.

Adjustment Procedures

Hydroelectricity, Geothermal, Wind, Photovoltaic, and Solar Thermal Energy. Electricity generated from hydropower and geothermal, wind, photovoltaic, and solar thermal energy has no fuel cost. Operation and maintenance costs associated with these energy sources are included indirectly in the prices of the electricity sold by power producers. Therefore, use of these renewable sources for electricity generation is removed from the expenditure calculations. Direct use of geothermal and solar energy also has no fuel cost and is omitted from SEDS energy expenditure calculations.

Residential Wood. Some residential wood is purchased and some acquired at no cost. Based on responses to the Form EIA-457, "1980 Residential Energy Consumption Survey," Census division percentages of wood purchased were developed and applied to the residential wood consumption in each State in the divisions in 1970 through 1989. Based on responses to the Form EIA-457, "1993 Residential Energy Consumption Survey," Census region percentages were developed and applied to the residential wood consumption of the States in each region in 1990 forward.

Commercial Wood and Waste. Some commercial wood and waste is purchased and some acquired at no cost. Conventional commercial wood acquired at no cost was estimated using the same percentages used for the residential sector. Wood and waste acquired at no cost by commercial combined heat-and-power facilities was estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

Industrial Wood and Waste. The cost of wood and waste products used for energy vary widely from more expensive woods to free industrial waste products. Industrial consumption is broken into two segments, manufacturing industries and combined heat and power (CHP) facilities in order to estimate quantities received at no cost.

Adjustments to manufacturing wood and waste consumption in 1994 forward are based on information gathered on the Form EIA-846, "1994 Manufacturing Energy Survey (MECS)." Adjustments to manufacturing consumption in 1980 through 1993 are based on information gathered on the Form EIA-846, "1991 Manufacturing Energy Survey." Adjustments to industrial wood and waste consumption in 1970 through

Table TN56. Energy Consumption Adjustments for Calculating Expenditures by State, 2008
(Billion Btu)

State	Refinery Use							
	Distillate Fuel Oil	Residual Fuel Oil	LPG	Other Petroleum [a]	Natural Gas [b]	Coal	Electricity [c]	Total
AK	209	2	8	26,960	30,848	—	258	58,285
AL	66	3	5	12,638	20,957	—	11,879	45,548
AR	97	—	4	10,122	10,948	—	5,784	26,955
AZ	—	—	—	189	—	—	—	189
CA	886	2,212	4,019	227,048	101,589	—	9,794	345,547
CO	—	1	124	11,077	11,411	—	2,322	24,936
CT	—	—	—	421	—	—	—	421
DC	—	—	—	—	—	—	—	—
DE	2	272	3	24,295	1,399	12	450	26,434
FL	—	—	—	1,599	—	—	—	1,599
GA	—	—	—	3,084	—	—	—	3,084
HI	27	2,432	4	13,874	53	—	730	17,121
IA	—	—	—	1,096	—	—	—	1,096
ID	—	—	—	—	—	—	—	—
IL	38	22	782	101,993	20,340	35	4,899	128,109
IN	26	70	90	49,395	20,959	56	5,212	75,807
KS	23	197	870	35,194	10,135	2	1,159	47,581
KY	26	—	503	29,234	8,696	14	4,974	43,448
LA	73	5	235	353,359	122,929	—	9,143	485,744
MA	—	—	—	876	—	—	—	876
MD	—	—	—	177	—	—	—	177
ME	—	—	—	—	—	—	—	—
MI	15	218	74	14,147	11,548	19	3,500	29,520
MN	25	212	240	37,253	9,311	12	2,564	49,616
MO	—	—	—	614	—	—	—	614
MS	35	—	3	36,983	14,546	—	5,498	57,065
MT	—	—	25	20,723	2,043	—	980	23,770
NC	—	—	—	3,777	—	—	—	3,777
ND	22	15	50	6,858	2,296	41	398	9,680
NE	—	—	—	122	—	—	—	122
NH	—	—	—	—	—	—	—	—
NJ	14	177	8	84,579	4,144	—	1,589	90,511
NM	30	1	17	14,511	13,153	—	2,319	30,031
NV	242	—	241	164	1,582	—	2,652	4,882
NY	—	—	—	2,876	—	—	—	2,876
OH	28	241	111	59,177	22,416	21	6,312	88,304
OK	19	78	44	52,365	19,742	7	1,658	73,912
OR	—	—	—	141	—	—	—	141
PA	56	589	159	97,337	15,242	321	7,260	120,965
RI	—	—	—	—	—	—	—	—
SC	—	—	—	3,374	—	—	—	3,374
SD	—	—	—	—	—	—	—	—
TN	12	30	41	23,553	7,252	34	3,532	34,453
TX	322	10	1,594	577,748	209,321	—	35,920	824,915
UT	—	255	12	18,804	3,498	—	1,527	24,096
VA	51	1,129	12	11,074	5,166	283	2,781	20,497
VT	—	—	—	—	—	—	—	—
WA	336	38	1,160	64,249	9,268	—	4,053	79,103
WI	23	138	90	4,881	9,835	17	2,656	17,640
WV	46	340	4	6,475	3,072	128	2,223	12,288
WY	—	52	15	18,139	6,416	—	1,606	26,228
US	2,749	8,739	10,548	2,062,554	730,115	1,001	145,631	2,961,337

See footnotes at end of table.

Table TN56. Energy Consumption Adjustments for Calculating Expenditures by State, 2008 (Continued)

(Billion Btu)

State	Residential		Commercial		Industrial						Transportation	Electrical System Energy Losses	Total
	Geothermal and Solar/PV [d]	Wood	Geothermal and Hydro-electricity	Wood and Waste	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Hydro-electricity	Geothermal	Wood and Waste	Ethanol Production Losses [e]	Natural Gas Pipeline Fuel		
AK	62	838	71	133	—	253,685	—	—	10	—	2,059	44,626	359,770
AL	172	5,291	—	842	—	24,526	—	49	17,227	—	16,789	659,111	769,554
AR	632	1,715	—	285	—	3,017	—	25	7,483	—	10,014	338,968	389,093
AZ	4,501	7,896	40	1,266	—	21	—	290	980	3,122	22,789	560,367	598,339
CA	25,150	15,737	532	3,373	—	68,964	—	1,429	10,619	5,493	7,970	1,970,230	2,449,552
CO	581	6,438	185	1,024	—	63,810	—	313	262	7,094	16,150	383,109	496,809
CT	1,275	1,912	—	304	—	—	—	—	3,275	—	4,311	227,449	238,947
DC	2	598	—	95	—	—	—	—	—	—	208	87,073	87,976
DE	330	800	—	127	—	—	—	—	52	—	19	86,322	114,084
FL	43,601	1,412	1,424	322	—	1,011	—	—	12,218	—	9,848	1,661,770	1,733,206
GA	626	8,038	6	1,278	—	—	217	12	16,808	1,442	6,132	993,167	1,029,368
HI	2,623	—	5	512	—	—	387	2	516	—	2	76,116	97,285
IA	350	4,386	555	783	—	—	—	—	12,494	135,818	14,241	334,217	368,122
ID	129	1,868	493	297	—	—	—	890	2,942	2,119	7,043	175,613	189,275
IL	3,035	16,831	—	2,677	—	90	—	—	7,622	58,051	13,459	1,062,573	1,234,397
IN	2,790	8,914	555	2,210	—	163	—	—	9,857	33,509	7,152	786,024	893,473
KS	146	4,041	580	643	—	15,676	—	—	1,725	25,587	24,435	290,338	385,165
KY	1,353	4,744	580	755	—	4,661	—	—	4,162	2,009	13,417	686,451	759,570
LA	777	2,665	580	424	—	177,156	—	49	14,789	57	55,320	578,397	1,315,903
MA	411	3,621	610	576	—	—	74	—	2,897	—	1,174	410,600	420,839
MD	521	4,851	—	930	—	—	—	—	3,381	—	2,546	465,277	477,682
ME	255	918	—	472	—	—	7,509	—	7,930	—	1,008	85,771	103,862
MI	3,618	14,642	571	3,092	—	11,789	254	—	8,281	13,106	24,086	777,212	873,065
MN	1,019	7,638	—	1,313	—	—	1,159	—	10,109	41,463	18,000	505,436	594,291
MO	297	8,766	—	1,394	—	—	—	—	3,815	12,874	7,248	619,982	642,116
MS	41	3,140	603	499	—	10,393	—	49	3,154	255	29,463	350,625	455,032
MT	70	1,343	121	214	—	4,932	—	82	1,437	—	7,445	112,608	152,022
NC	989	8,418	75	1,339	—	—	24	—	8,826	—	5,461	955,553	984,463
ND	370	1,028	303	164	—	8,081	—	—	781	8,873	11,966	91,225	123,599
NE	253	2,591	662	437	—	400	—	—	2,236	67,955	10,036	211,684	228,422
NH	114	783	—	125	—	—	76	—	1,091	—	9	80,654	82,852
NJ	2,777	2,706	—	434	—	—	—	—	1,984	—	1,952	591,605	691,970
NM	284	2,626	60	418	—	87,782	—	283	341	1,277	13,709	161,920	297,453
NV	1,708	3,198	599	509	—	4	—	488	370	—	3,113	258,572	273,443
NY	1,970	20,841	613	3,740	—	702	676	—	6,435	4,994	12,859	1,058,407	1,109,119
OH	2,080	16,385	571	2,606	—	874	—	—	7,723	19,216	11,670	1,171,085	1,301,299
OK	55	2,183	—	347	—	71,590	—	—	4,627	—	28,448	413,500	594,662
OR	2,112	4,714	507	795	—	27	—	195	8,212	4,313	7,537	361,734	385,975
PA	1,876	4,262	555	1,029	—	7,664	—	—	14,865	—	38,675	1,105,045	1,294,937
RI	67	601	—	96	—	—	—	—	65	—	884	57,446	59,158
SC	489	4,118	6	847	—	—	—	—	11,735	—	2,692	592,568	615,828
SD	355	1,175	812	187	—	548	—	295	85	45,967	4,705	80,630	88,792
TN	188	6,705	—	1,066	—	167	—	—	8,004	4,749	10,619	765,372	826,573
TX	1,864	11,707	607	1,944	—	339,015	—	—	9,409	10,878	112,400	2,549,965	3,851,826
UT	90	2,741	293	436	—	21,645	—	472	155	—	12,251	207,133	269,313
VA	1,282	6,782	603	1,921	—	4,570	88	—	10,209	—	8,777	808,990	863,718
VT	133	413	—	66	—	—	208	—	928	—	15	42,183	43,945
WA	239	8,036	1,164	1,278	—	—	23	—	12,749	—	6,804	641,665	751,060
WI	729	8,177	—	1,372	—	—	1,610	—	28,232	25,778	2,691	515,211	575,662
WV	93	1,861	3	296	—	9,355	4,210	—	945	—	19,652	251,434	300,138
WY	54	739	443	118	—	61,002	—	77	76	362	17,627	122,629	228,992
US	114,541	261,834	15,391	47,408	—	1,253,319	16,514	5,000	304,129	536,362	666,881	27,425,640	33,608,356

[a] In this table, "other petroleum" consists of: still gas and petroleum coke consumed as process fuel; and aviation gasoline blending components, motor gasoline blending components, pentanes plus, and unfinished oils used as intermediate products.
[b] Natural gas including supplemental gaseous fuels.
[c] Electricity is converted at the rate of 3,412 Btu per kilowatthour.
[d] Solar thermal and photovoltaic energy. Includes small amounts consumed by the commercial sector that cannot be separately identified.
[e] Energy losses and co-products from the production of fuel ethanol.
— = No consumption. NA = Not available.
Source: EIA, State Energy Data System.

Table TN57. Energy Consumption Adjustments for Calculating Expenditures, 1970 Through 2008
(Trillion Btu)

Year	Total (Gross) Consumption	Adjustments														Consumption used in Expenditure Calculations [c]
		Residential		Commercial		Industrial							Transportation	Electrical System Energy Losses	Total	
		Geothermal and Solar/PV [a]	Wood	Geothermal and Hydroelectricity	Wood and Waste	Refinery Use	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Hydroelectricity	Geothermal	Wood and Waste	Ethanol Production Losses [b]	Natural Gas Pipeline Fuel			
1970	67,747	—	298	—	6	2,714	—	1,442	34	—	788	—	740	11,503	17,525	50,222
1971	69,193	—	284	—	5	2,694	—	1,456	34	—	804	—	761	12,103	18,140	51,053
1972	72,721	—	282	—	5	2,847	—	1,497	34	—	859	—	786	13,056	19,366	53,355
1973	75,778	—	263	—	5	3,010	—	1,539	35	—	900	—	745	13,900	20,395	55,382
1974	73,975	—	275	—	5	2,983	—	1,520	33	—	896	—	684	14,109	20,506	53,470
1975	72,023	—	316	—	6	2,884	—	1,434	32	—	822	—	595	14,341	20,430	51,593
1976	76,043	—	357	—	7	2,907	—	1,679	33	—	942	—	559	15,195	21,679	54,364
1977	78,028	—	402	—	8	3,008	—	1,706	33	—	989	—	544	15,938	22,627	55,401
1978	80,055	—	462	—	9	2,939	—	1,694	32	—	1,081	—	541	16,713	23,471	56,584
1979	80,926	—	543	—	10	3,078	—	1,534	34	—	1,086	—	613	16,922	23,819	57,107
1980	78,150	—	627	—	16	3,052	—	1,058	33	—	1,283	—	650	17,235	23,954	54,347
1981	R 76,206	—	651	—	16	2,204	—	959	33	—	1,354	6	660	17,225	R 23,107	53,272
1982	R 73,114	—	724	—	16	2,089	—	1,144	33	—	1,310	16	614	16,889	R 22,835	50,423
1983	R 73,001	—	722	—	16	2,121	140	1,010	33	—	1,480	R 29	505	17,327	R 23,385	49,746
1984	R 76,657	—	733	—	16	2,254	135	1,113	33	—	1,510	R 36	545	17,875	R 24,250	52,516
1985	R 76,567	—	755	—	18	2,046	128	1,001	33	—	1,503	R 43	521	18,265	R 24,313	R 52,379
1986	R 76,753	—	688	—	20	2,285	103	954	33	—	1,478	R 49	501	18,247	R 24,359	52,506
1987	R 79,125	—	634	—	22	2,485	72	1,194	33	—	1,472	R 56	538	18,675	R 25,181	R 54,043
1988	R 82,874	—	676	—	24	2,696	85	1,134	33	—	1,531	R 56	633	19,589	R 26,458	56,515
1989	R 84,935	58	684	3	73	2,710	59	1,103	28	2	684	R 56	650	21,006	R 27,115	57,924
1990	R 84,674	61	337	4	59	2,803	51	1,269	31	2	716	R 50	682	21,420	R 27,485	R 57,307
1991	R 84,607	64	353	4	60	2,668	39	1,164	30	2	685	R 57	621	21,613	R 27,360	57,353
1992	R 85,962	66	371	4	66	2,954	27	1,208	31	2	689	R 64	608	21,479	R 27,571	R 58,504
1993	R 87,631	68	308	4	68	2,878	21	1,199	30	2	642	R 75	643	22,275	R 28,214	59,531
1994	R 89,284	70	292	5	66	2,991	19	1,153	62	3	662	R 83	706	22,564	R 28,678	60,712
1995	91,235	71	292	6	66	2,915	15	1,253	55	3	445	R 87	723	23,356	29,285	62,055
1996	R 94,245	72	303	7	77	3,203	14	1,280	61	3	495	R 62	734	24,068	30,380	63,970
1997	94,910	72	233	7	80	3,196	5	1,251	58	3	493	81	781	24,325	30,586	64,423
1998	R 95,191	72	207	8	71	3,042	—	1,212	55	3	493	R 87	657	25,262	R 31,170	64,117
1999	96,804	72	218	9	66	3,051	—	1,103	49	4	495	R 91	663	25,849	R 31,668	65,229
2000	98,866	70	235	9	67	2,941	—	1,110	42	4	459	R 100	659	26,558	R 32,252	66,699
2001	R 96,292	69	210	9	46	3,152	—	1,139	33	5	437	R 109	641	R 25,810	R 31,659	64,713
2002	R 97,789	69	213	9	43	R 3,027	—	R 1,135	39	5	312	R 131	R 683	R 26,368	R 32,034	R 65,819
2003	R 98,136	71	225	12	46	R 3,142	—	R 1,147	43	3	315	R 170	R 609	26,306	R 32,090	R 66,112
2004	R 100,322	73	230	13	46	R 3,099	—	R 1,123	33	4	536	R 205	582	R 26,782	R 32,725	R 67,655
2005	R 100,440	77	249	14	49	3,107	—	R 1,138	32	4	335	R 232	R 601	R 27,324	R 33,163	R 67,337
2006	R 99,756	85	227	15	45	3,187	—	R 1,171	29	4	R 293	R 288	R 602	R 27,081	R 33,027	R 66,790
2007	101,468	97	250	15	45	3,157	—	R 1,259	16	5	R 310	R 380	R 642	R 27,711	R 33,887	R 67,654
2008	99,382	115	262	15	47	2,961	—	1,253	17	5	304	536	667	27,426	33,608	65,856

[a] Solar thermal and photovoltaic energy. Includes small amounts consumed by the commercial sector that cannot be separately identified. See Section 5 of the Technical Notes for explanation of estimation methodology.

[b] Energy losses and co-products from the production of fuel ethanol.

[c] Includes adjustments of supplemental gaseous fuels and processed fuels not shown on this table.

— = No consumption.

R = Revised data.

Note: Totals may not equal sum of components due to independent rounding.

Sources: EIA, State Energy Data System. All data are available via the full-precision data file (CSV) at http://www.eia.gov/emeu/states/sep_prices/total/csv/pr_adjust_consum.csv. See also the following individual data series shown at http://www.eia.gov/emeu/states/sep_use/total/pdf/use_us.pdf

Total (Gross) Consumption: Table 7 • **Residential Geothermal and Solar/PV:** Table 8 • **Commercial Geothermal and Hydroelectricity:** Table 9 • **Industrial Hydroelectricity:** Table 10.

1979 are based on the 1980 average ratios for each State. The 1991 and 1994 MECS report the quantities consumed and quantities purchased of five types of wood and waste in each of four (MECS 1991) or five (MECS 1994) SIC categories of industries. The two quantity series are used to calculate SIC category average percentages of wood and waste obtained at no cost. These percentages are applied to the estimated consumption in those SIC categories in each State to estimate the State's manufacturing uncosted wood and waste.

Estimates of wood and waste obtained at no charge by industrial CHP facilities for 1989 forward are estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

Each State's industrial wood and waste consumption quantities acquired at no cost are the sum of the estimated manufacturing and CHP facilities' quantities for each year.

Refinery Fuel. Petroleum refinery consumption of distillate fuel, residual fuel, liquefied petroleum gases, petroleum coke, still gas, natural gas, steam coal, and electricity is estimated for each State and subtracted from the State's industrial sector total of each energy source.

Refineries' consumption of each fuel is available in the data sources by State or group of States (1970 through 1980) and by Petroleum Administration for Defense (PAD) districts or subdistricts (1981 forward). Where State-level data for the individual fuels are not available, they are estimated by allocating the group or district's values to the States with operating refineries within that group or district. The refining States' industrial sector consumption of each fuel is added together for each group or district to derive that group or district's industrial sector consumption subtotal. Then each State's portion of the group or district's refinery fuel consumption is calculated in proportion to its share of the group or district's industrial sector consumption subtotal.

In some cases, the estimated State refinery fuel consumption of residual fuel or LPG exceeds the estimate of the total industrial sector consumption of that fuel for that State. For 1970 through 2006, the refinery fuel consumption for the PAD district or subdistrict, group of States, or individual State is reduced until each State has positive industrial consumption. The excess refinery fuel is reallocated to a different PAD district or subdistrict, group of States or individual State as shown in Table TN58. When this adjustment involves a PAD district or subdistrict or group value, the refineries' consumption estimates for all States within the PAD district or subdistrict or group are recalculated using these new values. From 2007 forward, this adjustment is no longer made.

Table TN58. Reallocations of Excess Refinery Fuel Consumption, 1970 Through 2006

Year	Fuel	Thousand Barrels	Excess in:	Reallocated to:
1971	Residual Fuel Oil	294	Kansas	Oklahoma
1973	Residual Fuel Oil	45	Group 4: Kentucky, Tennessee	Illinois
1979	LPG	173	Montana	Wyoming
1985	Residual Fuel Oil	212	PAD District IV	PAD District V
1986	Residual Fuel Oil	403	PAD District IV	PAD District V
1987	Residual Fuel Oil	497	PAD District IV	PAD District V
1988	Residual Fuel Oil	305	PAD District IV	PAD District V
1989	Residual Fuel Oil	381	PAD District IV	PAD District V
1990	Residual Fuel Oil	336	PAD District IV	PAD District V
1991	Residual Fuel Oil	378	PAD District IV	PAD District V
1992	Residual Fuel Oil	361	PAD District IV	PAD District V
1996	Residual Fuel Oil	184	PAD District IV	PAD District V
1997	Residual Fuel Oil	100	PAD District IV	PAD District V
1998	Residual Fuel Oil	82	PAD District IV	PAD District V
1999	Residual Fuel Oil	142	PAD District IV	PAD District V
2000	Residual Fuel Oil	224	PAD District IV	PAD District V
2001	Residual Fuel Oil	149	PAD District IV	PAD District II
2001	Residual Fuel Oil	95	PAD District V	PAD District II
2001	Residual Fuel Oil	281	PAD District V	PAD District I
2002	Residual Fuel Oil	33	PAD District V	PAD District III
2002	Residual Fuel Oil	67	PAD District V	PAD District IV
2003	Residual Fuel Oil	228	PAD District V	PAD District III
2004	Residual Fuel Oil	296	PAD District V	PAD District III
2005	LPG	198	PAD District V	PAD District IV

Source: EIA calculations based on data from the State Energy Data System and the *Petroleum Supply Annual*.

Because crude oil consumption is not an individual fuel in SEDS for 1970 through 1980, the small amounts of crude oil that were used at refineries during those years were allocated to residual and distillate fuels consumed at refineries. The allocation from crude oil refinery use to

residual and distillate fuels refinery use was made according to each fuel's share of the total crude oil used directly (including losses) as residual and distillate fuels from the EIA *Petroleum Supply Annual, Volume 1,* of each year, Table 2.

Refinery consumption of still gas, excluding still gas consumed as petrochemical feedstocks, is subtracted from the SEDS industrial sector total for 1970 through 1985. Beginning in 1986, EIA data series no longer report refinery fuel and feedstock use separately, and all industrial still gas consumption is removed.

Refineries' consumption of coal is withheld in the data source for 1999 and 2000 and unpublished estimates developed by the data source office are used for 1999 and 2000. For 2001 and 2002, the U.S. values for refinery consumption of coal are published although the PAD district values are withheld. The PAD district values for 2001 and 2002 are estimated by applying the PAD districts' percentages of the U.S. total in 2000 to the U.S. totals for 2001 and 2002.

Intermediate Products. Aviation gasoline blending components, motor gasoline blending components, natural gasoline (1970 through 1983), pentanes plus (1984 forward), plant condensate (1970 through 1983), unfinished oils, and unfractionated stream (1970 through 1983) are used at refineries and blending plants to make end-use petroleum products, particularly motor gasoline. Accordingly, consumption of these products is completely removed.

Crude Oil Lease, Plant, and Pipeline Fuel. Industrial crude oil is assumed to be used as lease, plant, and pipeline fuel. Because these are process fuel uses, this crude oil is removed from SEDS industrial sector consumption.

Natural Gas Lease and Plant Fuel. Natural gas consumed as lease and plant fuel is process fuel and is subtracted from SEDS industrial sector natural gas totals by State and year.

Natural Gas Pipeline Fuel. Most of the natural gas consumed in the transportation sector of is used to power pipelines. As such, it is a process fuel and is subtracted from SEDS consumption in order to calculate expenditures.

Electricity Exports. Electricity exported to Canada and Mexico are excluded from the calculations of U.S. domestic energy expenditures and U.S. average energy prices.

Electrical System Energy Losses. The amount of energy lost during generation, transmission, and distribution of electricity (including plant use and unaccounted for electrical energy) is process fuel and is subtracted from sectoral energy consumption estimates used in the price and expenditure tables. The energy losses are "paid for" when residential, commercial, industrial, and transportation sector consumers buy the electricity produced by the electric power sector.

Energy Losses and Co-products from the Production of Fuel Ethanol. Fuel ethanol is produced from corn and other biomass inputs that are not included elsewhere as energy sources. The difference in heat content of the feedstock and the fuel ethanol is considered process fuel and is subtracted from sector energy consumption estimates used in the price and expenditure tables.

Data Sources

Capacity of Petroleum Refineries. 1982 forward: EIA, *Petroleum Supply Annual, Volume 1*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html tables titled "Number and Capacity of Operable Petroleum Refineries," columns titled, "Crude Capacity, Barrels per Calendar Day, Operating" (1982–1985), and "Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Operating" (1986 forward).

1979–1981: EIA, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1978: EIA, Energy Data Reports, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1970–1977: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

Fuel Consumed at Refineries. 1981–1994, 1996, and 1998 forward: EIA, *Petroleum Supply Annual, Volume 1*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html table titled "Fuels Consumed at Refineries by PAD District." Data for 1991 are from a separately published an EIA *Errata* dated November 10, 1992, GPO Stock No. 061-003-00758-9.

1995, 1997: EIA, *Petroleum Supply Annual, Volume 1*, table titled "Fuels Consumed at Refineries by PAD District." Data for coal, electricity, and natural gas are not published and values for the previous year are repeated.

1976–1980: EIA, Energy Data Reports, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

1970–1975: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

Intermediate Products. 1970 forward: EIA, State Energy Data System, industrial sector consumption estimates for aviation gasoline blending components, crude oil, motor gasoline blending components, natural gasoline (1970–1983), pentanes plus (1984 forward), petroleum coke, plant condensate (1970–1983), still gas (excluding still gas consumed as petrochemical feedstocks, 1970–1985), unfinished oil, and unfractionated stream (1970–1983).

Natural Gas Lease, Plant, and Pipeline Fuel Use. 1997 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm (use drop-down menu to select area, then click on icon that says "Download Series History") and published in the EIA, *Natural Gas Annual*, Tables 26 through 76.

1993–1996: EIA *Historical Natural Gas Annual 1930 Through 2000,* http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html Table 15.

1970–1992: EIA *Natural Gas Annual 1994, Volume II,* Table 14.

Residential Wood. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.gov/emeu/recs/contents.html.

1970–1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Commercial Wood and Waste. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.gov/emeu/recs/contents.html.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Industrial Wood and Waste. 1994 forward: EIA, unpublished data from the "1994 Manufacturing Energy Consumption Survey" (Form EIA-846) http://www.eia.gov/emeu/mecs/contents.html.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1993: EIA, unpublished data from the "1991 Manufacturing Energy Consumption Survey" (Form EIA-846).